1. **INTRODUCTION:**

The idea to have a TNC + laptop computer attached to a handheld transceiver seems attractive. Several home brew versions have been tried on SHARP PC 5000 and Tandy 100 computers. None were truly portable or Clutter free.

We describe here how to affix a UMPAD (Universal packet assembler/disassembler) onto a modem board inside the Toshiba T1000 computer.

2. **MATERIALS:**

An asynchronous modem board type S2311 (1) was purchased from Source One Systems (2). A UMPAD TNC with ribbon cable was purchased from PACCOM (3). A 27 pin right angle PC mount ribbon cable connector (part #SLEM 27R-2) was purchased from Burndy. A 27-strand non inverting ribbon cable was obtained from Electronic Innovations. A 5 pin Din female connector was obtained from Radio Shack.

3. **METHODS:**

The S3311 was modified in the following way: The straight ribbon connector and the DB9DTE were unsoldered from the original board. The right angle 27 pin connector was soldered to the board. The 5 pin Din socket was mounted on the modem back panel with countersunk screws. The ribbon cable was replaced with a "non inverting" type. The 3 transistors on the modem board were bent down to a clearance of 5mm. The 0.1uf Tantalum capacitor was unsoldered and mounted horizontally. The cables leading to the battery connector in the T1000 were bent down, and backwards (towards the battery case). Two 5 mill. rubber standoffs were screw mounted in the original DB9 = Pin holes. The UMPAD was glued to these rubber standoffs. The UMPAD was connected to 0, switched +9V, RxD and TxD (RS232) on the modem board. CTS and RTS were connected at the RS232 port of DCE and DTE respectively. The T1000 was modified by AXONIX (4) to a backlit ELT screen.

3. RESULTS

Figure 1 shows the modified modem board. Figure 2 shows the UMPAD with the radio/computer port. Figure 3 shows the assembled unite.

It works well in the car and in the office. Use is minimal though. We find it easier and cheaper to have a TNC + terminal at the various locations where packet can be used. Advantages are when going abroad, and to demonstrate/setup a system. We find that certain handheld transceivers are interfered by the clock (TH25AT e.g.)
FIGURES:

FIG. 1: 
The S2311 Modem board prepared for the UMPAD.

FIG. 2: 
The UMPAD with the Radioport and computer interface.
5. **DISCUSSION:**

Several improvements are still possible. A better backpanel to house the DIN connector. The TNC should be software switchable. The entire unit should be on a single board. Product R & D and PACCOM have been communicating about this project. An additional Hayes telephone modem should be installed on the board. **RFI** from the clock can be a limiting factor, if short antennae are used. Corn 2 should be available as COM 3 on a DB 9 port. Use TTL levels rather than RS 232 to save even more battery power.

6. **SUMMARY:**

Portable PR with a **T1000** computer is feasible with relatively little effort. A self contained unit attractively styled seems very desirable in the Amateur Radio Community.
REFERENCES:

(1) Product R & D Corporation
1194 Pacific Street
San Luis Obispo, CA 93401

(2) Source ONE Systems
13231 Champion Forest Drive
Suite 212
Houston, TX 77069

(3) PACCOM
3652 Wells Cypress Street
Tampa, FL 33607-4916

(4) AXONIX Corporation
2257 South 1100 East
Salt Lake City, UT 84106